IN THE CLAIMS

Please amend claims 1, 2, 36, 37, 71, 72, 106, 108 and 110 as follows:

1. (CURRENTLY AMENDED) A gain voltage controller for use with a sampled grating distributed Bragg reflector (SGDBR) laser, comprising:

a controller for providing separate current inputs to the SGDBR laser including a front mirror current controlling a front sampled grating mirror and a back mirror current controlling a back sampled grating mirror to control the SGDBR laser; and

a voltage monitor, coupled to a gain section of the SGDBR laser for monitoring a gain voltage of the gain section and providing input of the gain voltage to the controller;

wherein the controller comprises a digital signal processor (DSP) using a numerical minima search to control the front mirror current and the back mirror current to minimize the gain voltage monitored from the gain section of the SGDBR laser and the SGDBR laser comprises the front sampled grating mirror and the back sampled grating mirror bounding a cavity, the cavity including the gain section.

2. (CURRENTLY AMENDED) The gain voltage controller of claim 1, wherein the controller keeps the front sampled grating mirror controlled by the front mirror current and the back sampled grating mirror controlled by the back mirror current aligned with a cavity mode of the SGDBR laser.

3. (CANCELLED)

4. (PREVIOUSLY AMENDED) The gain voltage controller of claim 1, wherein the DSP dithers the front and back mirror currents.

5. (CANCELLED)

6. (PREVIOUSLY AMENDED) The gain voltage controller of claim 1, wherein the numerical minima search comprises using at least three data points of at least one of the front and back mirror currents versus the gain voltage to estimate a slope of a gain voltage curve with respect to the at least one of the front and back mirror currents.

7. (ORIGINAL) The gain voltage controller of claim 6, wherein numerical minima search further comprises a process of stepping toward the gain voltage minima and determining a next data point, identifying a best two points of the at least three data points, and using the next data point and the best two points to re-estimate the slope of the gain voltage curve.

8. (ORIGINAL) The gain voltage controller of claim 7, wherein the numerical minima search further comprises continuously repeating the process such that the next data point and the best two points of a prior process become the at least three data points of a subsequent process.

9. (PREVIOUSLY AMENDED) The gain voltage controller of claim 1, wherein the DSP uses a least mean squares (LMS) estimator to control the front mirror current and the back mirror current and determine at least one gain voltage minimum.

10. (ORIGINAL) The gain voltage controller of claim 9, wherein the LMS estimator uses an array of data points to estimate a gain voltage surface.

11. (ORIGINAL) The gain voltage controller of claim 9, wherein the LMS estimator models the gain voltage using a causal Volterra series expansion over the front and back mirror currents for a fixed phase section current and fixed gain section current of the laser.

12. (ORIGINAL) The gain voltage controller of claim 9, wherein the LMS estimator uses a memoryless 5-tap adaptive quadratic filter model.

13. (ORIGINAL) The gain voltage controller of claim 9, wherein the LMS estimator is achieved using an adaptive filter update algorithm.

14. (ORIGINAL) The gain voltage controller of claim 13, wherein the adaptive filter update algorithm is a gradient descent adaptation algorithm.

15. (ORIGINAL) The gain voltage controller of claim 13, wherein the gradient descent adaptation algorithm is a block LMS algorithm.

16. (ORIGINAL) The gain voltage controller of claim 13, wherein the gradient descent adaptation algorithm is an LMS algorithm.

17. (ORIGINAL) The gain voltage controller of claim 13, wherein the adaptive filter update algorithm is a recursive least squares adaptation algorithm.

18. (ORIGINAL) The gain voltage controller of claim 9, wherein the LMS estimator is achieved using an adaptive linear filter.

19. (ORIGINAL) The gain voltage controller of claim 9, wherein the LMS estimator is driven by white noise.

20. (ORIGINAL) The gain voltage controller of claim 9, wherein an initial tap-vector and inputs to the laser are stored in a laser calibration table.

21. (ORIGINAL) The gain voltage controller of claim 9, wherein a step size of the LMS estimator is reduced as the LMS estimator determines the at least one gain voltage minimum.

22 - 34 (CANCELLED)

35. (ORIGINAL) The gain voltage controller of claim 1, wherein the gain voltage controller is operated simultaneously with power and wavelength control of the laser.

36. (CURRENTLY AMENDED) A method of controlling a sampled grating distributed Bragg reflector (SGDBR) laser, comprising the steps of:

providing separate current inputs to the SGDBR laser including a front mirror current controlling a front sampled grating mirror and a back mirror current controlling a back sampled grating mirror to control the SGDBR laser; and

monitoring a gain voltage of a[the] gain section of the SGDBR laser and providing input of the gain voltage to the controller;

controlling the front mirror current and the back mirror current with a digital signal processor (DSP) using a numerical minima search to minimize the gain voltage monitored from the gain section of the SGDBR laser;

wherein the SGDBR laser comprises the front sampled grating mirror and the back sampled grating mirror bounding a cavity, the cavity including the gain section.

37. (CURRENTLY AMENDED) The method of claim 36, wherein the front sampled grating mirror is controlled by the front mirror current and the back sampled grating mirror is controlled by the back mirror current aligned with a cavity mode of the SGDBR laser.

38. (CANCELLED)

39. (PREVIOUSLY AMENDED) The method of claim 36, wherein the DSP dithers the front and back mirror currents.

40. (CANCELLED)

41. (PREVIOUSLY AMENDED) The method of claim 36, wherein the numerical minima search comprises using at least three data points of at least one of the front and back mirror currents versus the gain voltage to estimate a slope of a gain voltage curve with respect to the at least one of the front and back mirror currents.

42. (ORIGINAL) The method of claim 41, wherein numerical minima search further comprises a process of stepping toward the gain voltage minima and determining a next data point, identifying a best two points of the at least three data points, and using the next data point and the best two points to re-estimate the slope of the gain voltage curve.

43. (ORIGINAL) The method of claim 42, wherein the numerical minima search further comprises continuously repeating the process such that the next data point and the best two points of a prior process become the at least three data points of a subsequent process.

44. (PREVIOUSLY AMENDED) The method of claim 36, wherein the DSP uses a least mean squares (LMS) estimator to control the front mirror current and the back mirror current and determine at least one gain voltage minimum.

45. (ORIGINAL) The method of claim 44, wherein the LMS estimator uses an array of data points to estimate a gain voltage surface.

46. (ORIGINAL) The method of claim 44, wherein the LMS estimator models the gain voltage using a causal Volterra series expansion over the front and back mirror currents for a fixed phase section current and fixed gain section current of the laser.

47. (ORIGINAL) The method of claim 44, wherein the LMS estimator uses a memoryless 5-tap adaptive quadratic filter model.

48. (ORIGINAL) The method of claim 44, wherein the LMS estimator is achieved using an adaptive filter update algorithm.

49. (ORIGINAL) The method of claim 48, wherein the adaptive filter update algorithm is a gradient descent adaptation algorithm.

50. (ORIGINAL) The method of claim 48, wherein the gradient descent adaptation algorithm is a block LMS algorithm.

51. (ORIGINAL) The method of claim 48, wherein the gradient descent adaptation algorithm is an LMS algorithm.

52. (ORIGINAL) The method of claim 48, wherein the adaptive filter update algorithm is a recursive least squares adaptation algorithm.

53. (ORIGINAL) The method of claim 44, wherein the LMS estimator is achieved using an adaptive linear filter.

54. (ORIGINAL) The method of claim 44, wherein the LMS estimator is driven by white noise.

55. (ORIGINAL) The method of claim 44, wherein an initial tap-vector and inputs to the laser are stored in a laser calibration table.

56. (ORIGINAL) The method of claim 44, wherein a step size of the LMS estimator is reduced as the LMS estimator determines the at least one gain voltage minimum.

57 - 69 (CANCELLED)

70. (ORIGINAL) The method of claim 36, wherein the gain voltage controller is operated simultaneously with power and wavelength control of the laser.

71. (CURRENTLY AMENDED) An article of manufacture embodying logic that causes a programmable device to perform to implement a method of controlling a sampled grating distributed Bragg reflector (SGDBR) laser, comprising the steps of:

providing separate current inputs to the SGDBR laser including a front mirror current controlling a front sampled grating mirror and a back mirror current controlling a back sampled grating mirror to control the SGDBR laser; and

monitoring a gain voltage of a[the] gain section of the SGDBR laser and providing input of the gain voltage to the controller;

controlling the front mirror current and the back mirror current with a digital signal processor (DSP) using a numerical minima search to minimize the voltage monitored from the gain section of the laser;

wherein the SGDBR laser comprises the front sampled grating mirror and the back sampled grating mirror bounding a cavity, the cavity including the gain section.

72. (CURRENTLY AMENDED) The article of claim 71, wherein the front sampled grating mirror is controlled by the front mirror current and the back sampled grating mirror is controlled by the back mirror current aligned with a cavity mode of the SGDBR laser.

73. (CANCELLED)

74. (PREVIOUSLY AMENDED) The article of claim 71, wherein the DSP dithers the front and back mirror currents.

75. (CANCELLED)

76. (PREVIOUSLY AMENDED) The article of claim 71, wherein the numerical minima search comprises using at least three data points of at least one of the front and back mirror currents versus the gain voltage to estimate a slope of a gain voltage curve with respect to the at least one of the front and back mirror currents.

77. (ORIGINAL) The article of claim 76, wherein numerical minima search further comprises a process of stepping toward the gain voltage minima and determining a next data point, identifying a best two points of the at least three data points, and using the next data point and the best two points to re-estimate the slope of the gain voltage curve.

78. (ORIGINAL) The article of claim 77, wherein the numerical minima search further comprises continuously repeating the process such that the next data point and the best two points of a prior process become the at least three data points of a subsequent process.

79. (PREVIOUSLY AMENDED) The article of claim 71, wherein the DSP uses a least mean squares (LMS) estimator to control the front mirror current and the back mirror current and determine at least one gain voltage minimum.

80. (ORIGINAL) The article of claim 79, wherein the LMS estimator uses an array of data points to estimate a gain voltage surface.

81. (ORIGINAL) The article of claim 79, wherein the LMS estimator models the gain voltage using a causal Volterra series expansion over the front and back mirror currents for a fixed phase section current and fixed gain section current of the laser.

82. (ORIGINAL) The article of claim 79, wherein the LMS estimator uses a memoryless 5-tap adaptive quadratic filter model.

83. (ORIGINAL) The article of claim 79, wherein the LMS estimator is achieved using an adaptive filter update algorithm.

84. (ORIGINAL) The article of claim 83, wherein the adaptive filter update algorithm is a gradient descent adaptation algorithm.

85. (ORIGINAL) The article of claim 83, wherein the gradient descent adaptation algorithm is a block LMS algorithm.

86. (ORIGINAL) The article of claim 83, wherein the gradient descent adaptation algorithm is an LMS algorithm.

87. (ORIGINAL) The article of claim 83, wherein the adaptive filter update algorithm is a recursive least squares adaptation algorithm.

88. (ORIGINAL) The article of claim 83, wherein the LMS estimator is achieved using an adaptive linear filter.

89. (ORIGINAL) The article of claim 83, wherein the LMS estimator is driven by white noise.

90. (ORIGINAL) The article of claim 83, wherein an initial tap-vector and inputs to the laser are stored in a laser calibration table.

91. (ORIGINAL) The article of claim 83, wherein a step size of the LMS estimator is reduced as the LMS estimator determines the at least one gain voltage minimum.

92 - 104 (CANCELLED)

105. (ORIGINAL) The article of claim 71, wherein the gain voltage controller is operated simultaneously with power and wavelength control of the laser.

106. (CURRENTLY AMENDED) The gain voltage controller of claim 1, wherein the SGDBR laser further comprises a semiconductor optical amplifier (SOA) disposed at a front-side of the SGDBR laser for amplifying an output of the SGDBR laser.

107. (PREVIOUSLY ADDED) The gain voltage controller of claim 106, wherein optical power of the SGDBR laser is adjusted by a current to the SOA.

108. (CURRENTLY AMENDED) The method of claim 36, wherein the SGDBR laser further comprises a semiconductor optical amplifier (SOA) disposed at a front-side of the SGDBR laser for amplifying an output of the SGDBR laser.

109. (PREVIOUSLY ADDED) The method of claim 108, wherein optical power of the SGDBR laser is adjusted by a current to the SOA.

110. (CURRENTLY AMENDED) The article of claim 71, wherein the SGDBR laser further comprises a semiconductor optical amplifier (SOA) disposed at a front-side of the SGDBR laser for amplifying an output of the SGDBR laser.

111. (PREVIOUSLY ADDED) The article of claim 110, wherein optical power of the SGDBR laser is adjusted by a current to the SOA.